

Claims

1. A capacitive amplifier for detecting and amplifying an electrical tone conducted by one of a group of wires in order to identify and trace a particular wire, the capacitive amplifier suppressing noise signals having a predetermined fundamental noise frequency and suppressing noise signals having frequencies that are harmonics of said predetermined fundamental noise frequency, said capacitive amplifier comprising:
 - a. a probe for being placed adjacent a wire under test;
 - b. an input terminal coupled to the conductive probe for receiving an input signal therefrom;
 - c. a suppression unit coupled to the input terminal for receiving the input signal and for suppressing said noise signals;
 - d. an amplifier coupled to the suppression unit to amplify the noiseless output signal.
2. A capacitive amplifier according to claim 1, characterized in that said suppression unit being arranged for receiving the input signal and for providing a time-delayed signal of the input signal and to subtract the time-delayed signal from the input signal, the time-delayed signal being delayed by a delay period substantially equal to the inverse of the noise frequency to be suppressed or an integer multiple thereof.
3. A capacitive amplifier according to claim 2, characterized in that said suppression unit comprising
 - c1. an analog-to-digital (A/D) converter coupled to the input terminal for converting the input signal into a digital signal;
 - c2. a memory coupled to said A/D converter for storing digital signal values;
 - c3. a subtraction unit for receiving time-delayed digital signal values from said memory and for subtracting time-

delayed digital signal values from digital signal values;
and

c1. a digital-to analog (D/A) converter coupled to said subtraction unit.

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4. A capacitive amplifier according to claim 3, wherein said subtraction unit is part of a central processing unit (CPU) or its functions are performed by said CPU and said CPU is arranged for reading out digital signal values from said
10 memory after a storage time, said storage time being identical with said delay time, and for subtracting those time-delayed digital signal values from actual input digital signal values.

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5. A capacitive amplifier according to claim 1, further including a high pass filter coupled to said input terminal.

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6. A capacitive amplifier according to claim 5, wherein said high pass filter is comprised of a differential amplifier, wherein the positive input port of said differential amplifier is coupled to said input terminal and the negative input port of said differential amplifier is coupled to the output of a low pass filter and the input of said low pass filter is coupled to said input port.

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7. A capacitive amplifier according to claim 6, wherein said low pass filter has a cut-off frequency of about 300 Hz.

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8. A capacitive amplifier according to claim 5, wherein said high pass filter is part of a preamplifier stage comprising a preamplifier and said high pass filter.

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9. A capacitive amplifier according to claim 1, further including a volume tuning section coupled to said input terminal, said volume tuning section comprising a digital potentiometer and a push button section for switching on said ca

capacitive amplifier and for actuating said digital potentiometer.

10. A capacitive amplifier according to claim 1, wherein said
5 push button section comprises a push button and three electrical contacts arranged in a line such that by pressing the push button the middle contact is actuated and said capacitive amplifier is thereby switched on and by shifting the
10 pressed push button in the forward or the backward direction the front or the back contact is additionally actuated and the digital potentiometer is thereby controlled to increase or to reduce the signal level.

11. A capacitive amplifier according to claim 1, wherein said
15 probe includes a probe tip having an electrically non-conductive or high-resistive surface.

12. A capacitive amplifier according to claim 11, wherein
20 said probe tip is made of carbon fiber material or from anodized aluminum.

13. A tone generator for use in conjunction with a capacitive
amplifier according to anyone of the preceding claims, comprising a 4-position slide switch for selecting between the
25 modes square wave, sine wave, continuity and talking mode, wherein in the square wave mode a tone signal is output as a square wave signal, in the sine wave mode a tone signal is output as a sine wave signal, in the continuity mode the continuity of any conductor, circuit or electronic part can be
30 tested, and in the talking mode a specific DC voltage can be delivered.